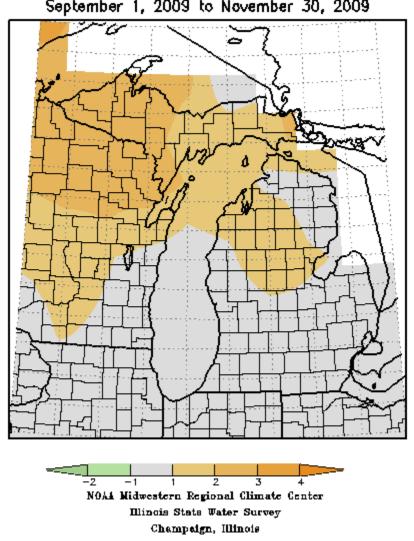
William D. Marino National Weather Service Grand Rapids, MI

The 2009 fall season over Southwest Lower Michigan featured above normal temperatures and below normal precipitation (Table 1). Snowfall was well below normal.

TABLE 1. The reported temperature and precipitation for the summer of 2009 at selected climate stations in Southwest Lower Michigan. Normals are computed from 30-year averages from 1971-2000.

Location		Temperature (F)	Precipitation (inches)	Snowfall (inches)
Grand Rapids	Reported	52.0°	10.68	0.7
	Normal	49.8°	11.64	8.3
	Departure	+2.2°	-0.96	-7.6
Lansing	Reported	51.0°	5.76	T
	Normal	49.2°	8.43	5.5
	Departure	+1.8°	-2.67	-5.5
Muskegon	Reported	51.8°	10.19	T
	Normal	49.6°	9.55	9.3
	Departure	+2.2°	+0.64	-9.3



Average Temperature Departure from Mean in Degrees F September 1, 2009 to November 30, 2009

Figure 1. The fall 2009 daily mean temperature departure from normal for Michigan.

The area averaged fall mean temperature was 50.6°F, which was 1.4°F warmer than the 1971 to 2000 normal. Figure 1 displays mostly near normal temperatures (within 1° of normal) over the Grand Rapids County Warning Area (CWA). The warmest departures from normal were over the northeast CWA, where departures were as high as 2° above normal. The NCDC state ranking map (Figure 2) reveals the state of Michigan ranked 81st out of 115 years, which puts Michigan in the above normal category for this fall. Figure 1 suggests that the warm overall state ranking was due to warmer temperatures in Upper and Northern Lower Michigan.

September-November 2009 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA

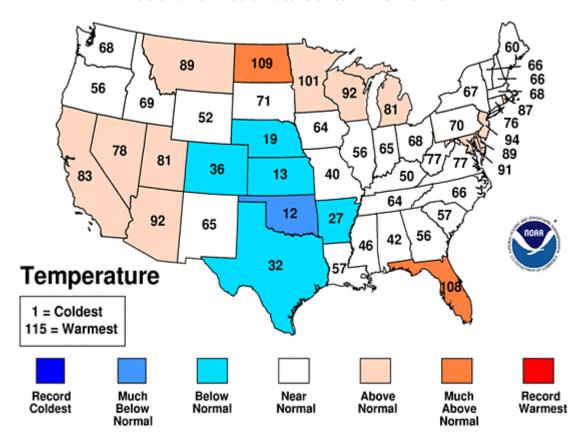


Figure 2. The fall 2009 temperature ranking for the contiguous United States.

Looking at the falls from the last 10 years (2000 through 2009) for Southwest Lower Michigan, there is a trend toward warmer falls when considering all thirty-six climate stations (Figure 3). The past ten falls averaged 50.8°, which is 1.6° above normal. Six of the past ten falls were warmer than normal, while none was colder than normal (i.e., less than 1° below normal, leaving four falls near normal (Figure 4). The fall season shows a stronger warm trend than of any of the other three seasons. The winter season shows the second strongest warm trend with five of the past ten being warmer than normal and two colder than normal.

Figs. 5-7 show the daily temperature anomalies were mostly below normal during October but were warmer than normal for both September and November.

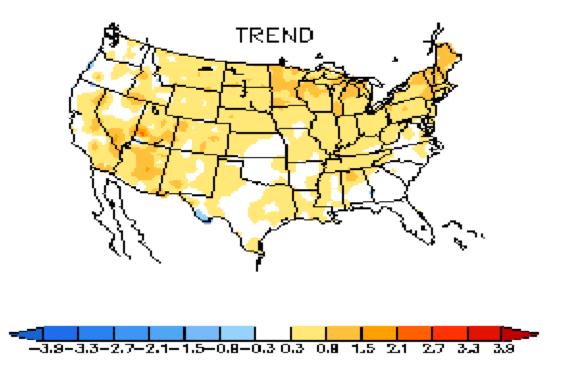


Figure 3. Fall (September-November) temperature trend. The trend is the mean temperature over the past ten years (1999-2008) minus the 1971-2000 mean.

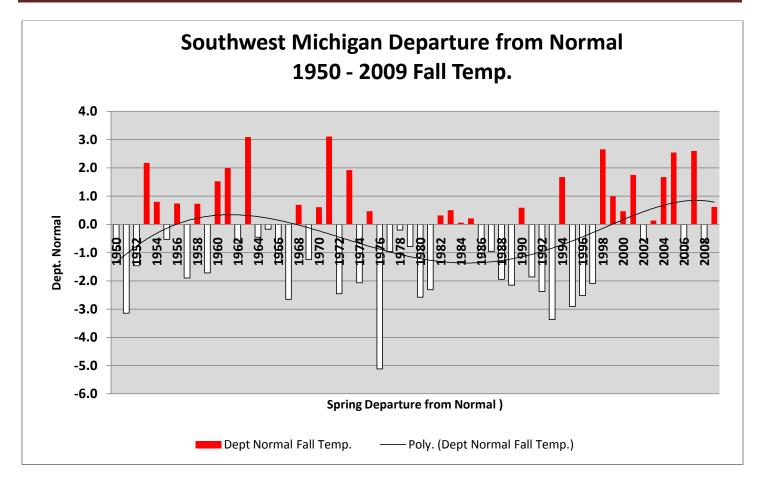


Figure 4. The graph above shows the fall mean area temperature departure from normal for all of Southwest Lower Michigan, from 1950 through 2009.

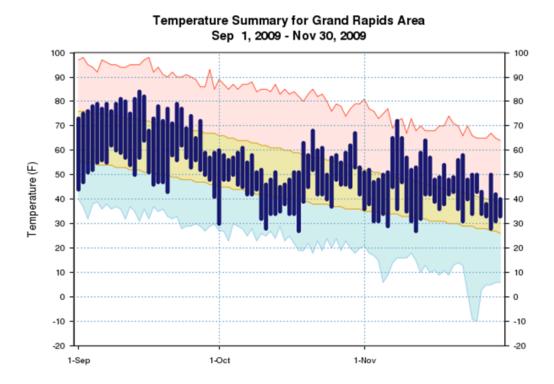


Figure 5. Fall 2009 daily temperatures for Grand Rapids. The daily maximum and minimum temperatures are connected by dark blue bars. The area between the maximum and minimum temperature has tan shading. Red lines connect the record high temperatures. Blue lines connect the record low temperatures.

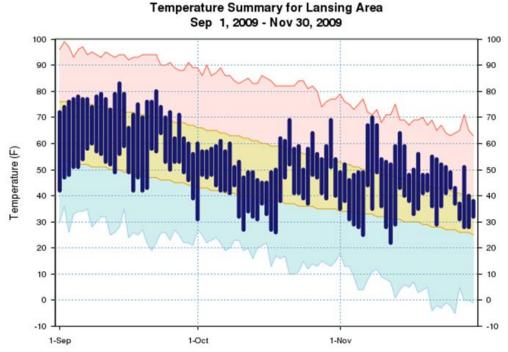


Figure 6. Same as Figure 5, expect for Lansing.

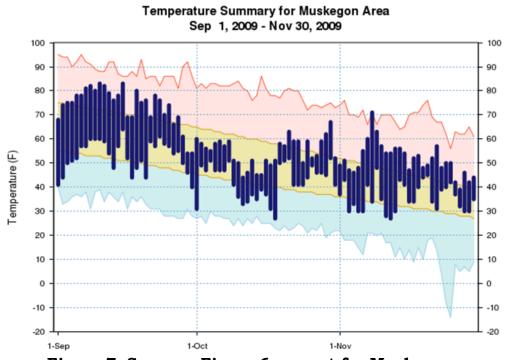


Figure 7. Same as Figure 6, expect for Muskegon.

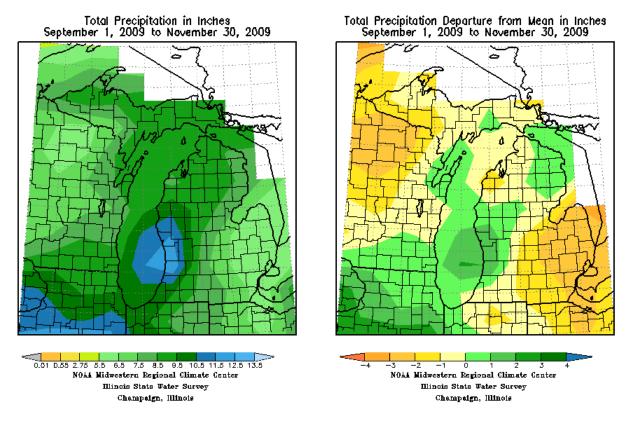


Figure 8. Total fall precipitation (a) and departure from normal (b) for Michigan.

The total precipitation ranged from 6.19 inches at Mason (Ingham County) to over 19.12 inches at Fennville (near Holland). Figure 8a displays a fairly widespread coverage of 9 to 11 inch totals. The mean precipitation for Southwest Lower Michigan was 9.00 inches, which was 0.74 inches below normal. Western sections of Southwest Lower Michigan ranged from 1 to 2 inches above normal while eastern sections were one to two inches below normal (Figure 8b).

For the state of Michigan, this was the 45th wettest fall out of 115 years (Figure 9). During the past fifteen years (1995 to 2009), there has been a significant trend toward drier falls over Southwest Lower Michigan (Figure 10). During that time, three years were wetter than normal (2001, 2003 and 2008), nine years below normal (1995, 1996, 1997, 1998, 1999, 2002, 2004, 2007 and 2009) and three years were near normal (2000, 2005, 2006; Figure 11).

September-November 2009 Statewide Ranks

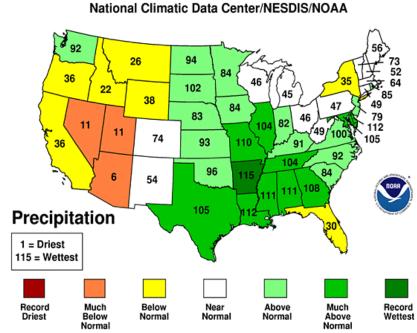


Figure 9. The NCDC summer precipitation ranking for the contiguous United States.

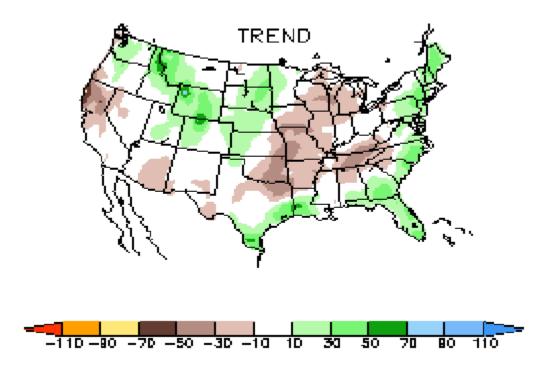


Figure 10 Fall precipitation trend.

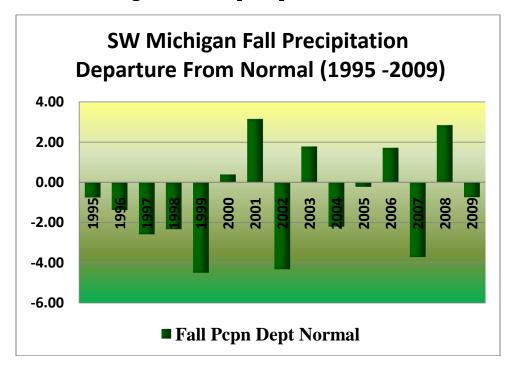
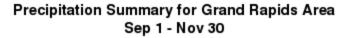
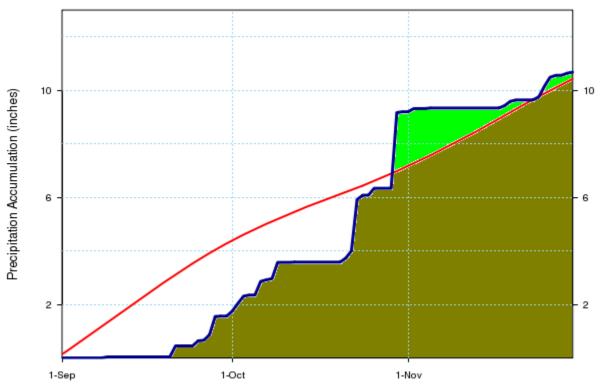


Figure 11. Total fall precipitation departure from normal for all of Southwest Lower Michigan from 1995 through 2009 (most recent trend period).

Grand Rapids, Lansing and Muskegon all received the heaviest precipitation in October while September and November were very dry months (Figures. 12 through 14).





Heavy dark blue line is precipitation accumulation for 2009. Smooth red line is normal.

Figure 12. Grand Rapids daily precipitation accumulation for the fall of 2009.

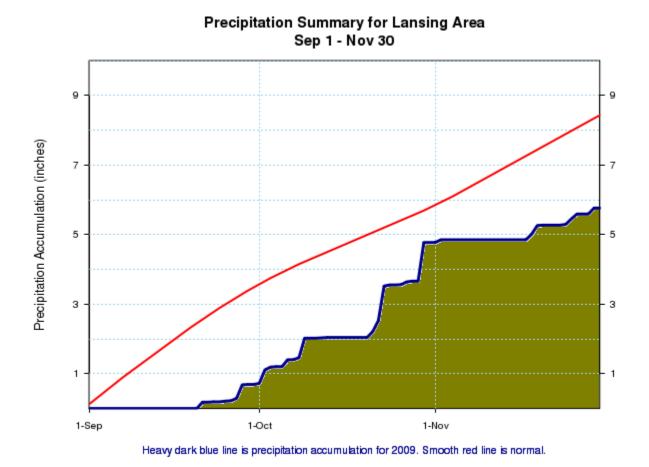


Figure 13. Lansing daily precipitation accumulation for the fall of 2009.

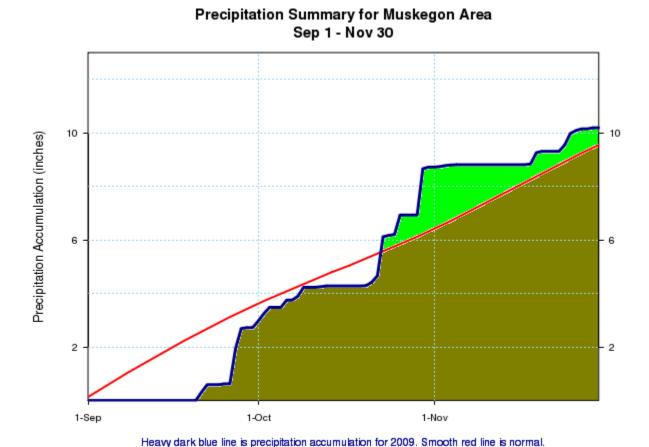


Figure 14. Muskegon daily precipitation accumulation for the fall of 2009.

Seasonal snowfall was considerably lacking. All of Southwest Lower Michigan had well below normal snowfall (Figures. 15 and 16). There was a little snowfall around the 27th of November as a strong storm system departed the area, but even that resulted in less than an inch in most locations.

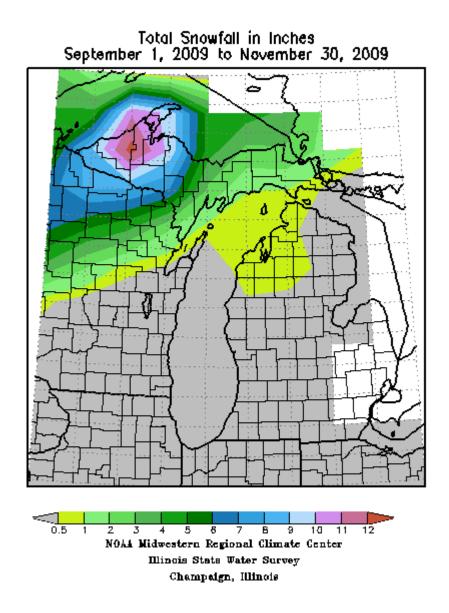


Figure 15. Fall snow total for Michigan.

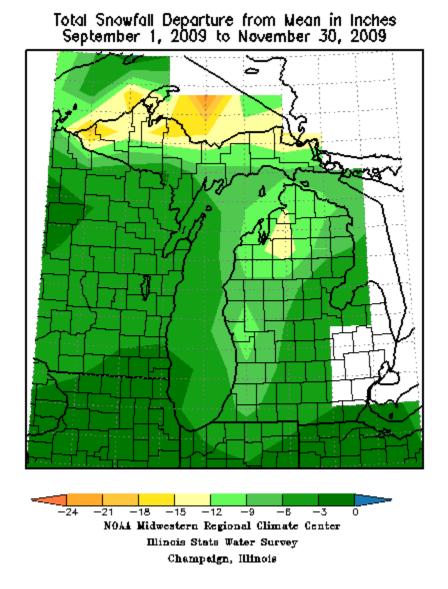


Figure 16. Fall total snowfall departure from normal.

For more details on the individual precipitation events, please see the monthly weather summaries listed below:

September 2009 Climate Summary

http://www.crh.noaa.gov/images/grr/climate/CS200909.pdf

October 2009 Climate Summary

http://www.crh.noaa.gov/images/grr/climate/CS200910.pdf

November 2009 Climate Summary

http://www.crh.noaa.gov/images/grr/climate/CS200911.pdf